MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2019 / 2020

TAL 7011 – ARCHITECTURE OF LARGE SOFTWARE SYSTEMS

(All sections / Groups)

30 SEPTEMBER 2019
2:30 P.M. – 4:30 P.M.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 5 pages (including cover page) with 5 Questions only.

2. Attempt **Question FIVE** and **ANY THREE** other questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the Answer Booklet provided.

Question 1 (4 + 4 + 2 marks)

Multimedia University is developing a new system, CAMSys, to replace the existing system ICEMS, in order to improve the management of academic activities in the university. CAMSys will have new functionalities as well as provide integration to other systems as part of improved services to the students and staff. The project is outsourced to Oracle, where a team of experienced consultants are engaged to implement the new system.

a) Draw the Architecture Business Cycle for this project. Describe the influences to the architect (state any assumptions if necessary).

b) Give TWO possible quality attributes for this system. Explain each quality attribute with a quality attribute scenario.

c) For each quality attribute, describe at least ONE possible tactic to achieve the quality attribute in the system.

Question 2 (2 + 4 + 4 marks)

MMU is proposing a new intranet system to manage program documentation that conforms to MQA requirements. This system is an extension to the current system where additional documentation on programs such as program objectives, program outcomes and program structure can be maintained by program coordinators in all the faculties. Furthermore, the Quality Assurance Department and faculty managers can obtain reports from the new system in order to fulfil MQA documentation requirements.

a) Identify at least TWO possible architectural drivers for this system. State any assumptions that you have, if additional information are required.

b) Explain how you can use Attribute-Driven Design (ADD) to produce a coarse-grained architecture of this system. Clearly describe the steps in producing the architecture.

c) Explain the criteria you can use to identify a suitable architectural pattern to expand the software architecture for this system. Using these criteria, select an architectural pattern that is suitable and briefly describe the main features of the architectural pattern.

Continued ...

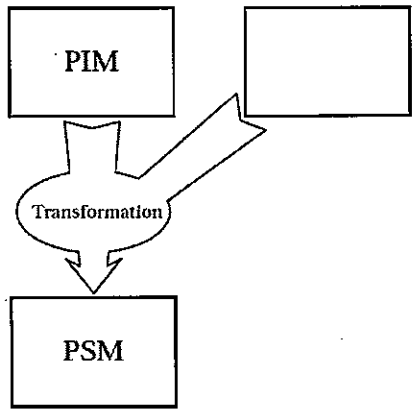
Question 3 (3 + 2 + 3 + 2 marks)

MyVisa is a new Web portal for the Malaysian Immigration Department that can be accessed from other countries in order to facilitate the applications for visas to enter Malaysia. This system allows the applicants to submit their details and print a document that can be brought to Malaysian Embassies at their countries to facilitate the visa processing. Currently all applicants have to complete a form manually and bring it to the embassies to be processed.

a) The primary purpose of software architecture is to serve as a communication vehicle among stakeholders. Different stakeholders will use the architecture to accomplish different tasks and thus require different views of the architecture. Produce a candidate view list for any THREE possible stakeholders of MyVisa project. Specify the level of details required for each view.

b) Suggest a possible software component to support the features described above. Using Unified Modelling Language (UML), draw the diagram representing the component.

c) The following diagram is a key process in Model Driven Architecture (MDA).



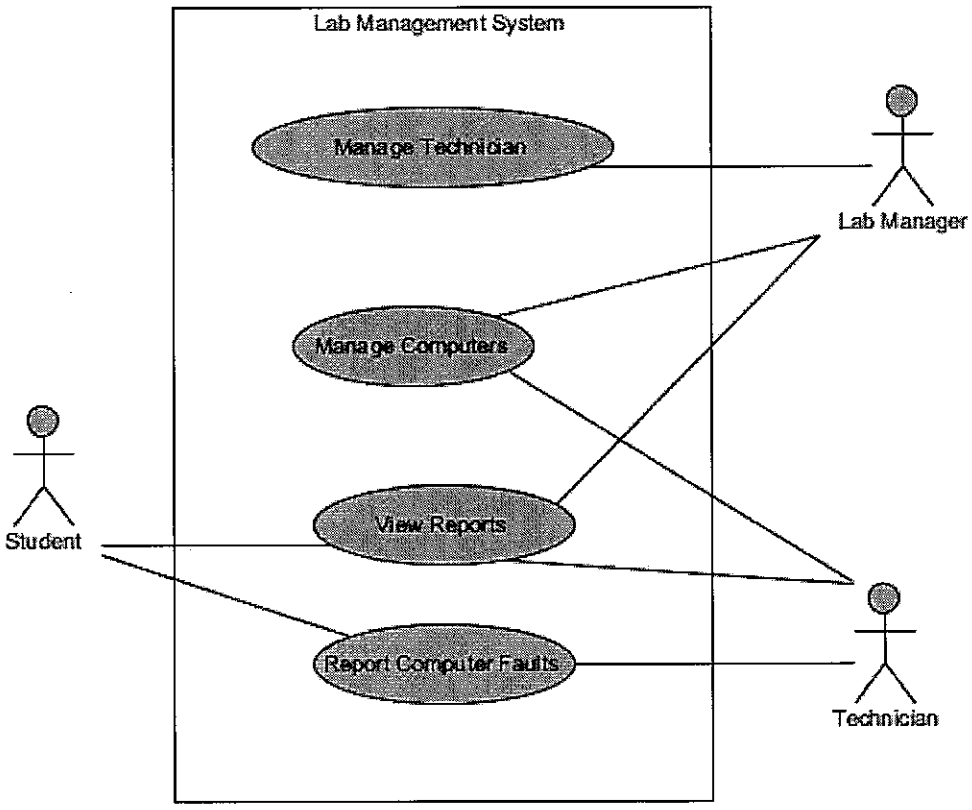
Explain the process in detail, with clear description of the contents of each box.

d) Using an example from MyVisa project, describe how this process can be used to develop the system.

Continued...

Question 4 (2 + 4 + 2 + 2 marks)

FCI is developing a Web-based system to manage computers in the laboratories. Students and lab technicians can report computer faults. Lab manager assigns repair tasks to lab technicians, and also assigns lab technicians to be responsible for a particular laboratory. After repairing a computer, the lab technician will update the system on the new status of the computer. All actors can view reports on relevant information about the computers and the laboratories. The following is the use case diagram:



a) If this system is to be partitioned into subsystems that can be developed separately, give TWO principles that you can follow while doing the partitioning.

b) Using the Jacobson use case technique, draw the second level use case diagram after the partitioning of this system.

c) Describe the two extended steps to improve this technique as proposed by Nasr, McDermid and Bernat (discussed in the lectures).

d) Select two functions from the use cases and discuss how you can map these functions to an object that can deliver these functions.

Continued...

Question 5 (2 + 2 + 3 + 3 marks)

Delicious Meals Sdn Bhd is a restaurant chain that manages a few restaurants around Klang Valley. An enterprise system is proposed to integrate existing systems such as Sales Management System, Financial Management System, and Inventory System. These systems were developed by different vendors and implemented at different times at the company, in line with the business growth.

a) Using this system as example, explain the purpose of an enterprise software system.

b) Describe any TWO structural components of an enterprise architecture.

c) Describe how the system can be integrated using the *gateway* architecture integration style.

d) Discuss an alternative architectural integration style that can be applied to integrate these different systems. Compare this against the gateway architecture integration style described in Question 5(c).

End of Page